Broad Agency Announcement (BAA) TCBAA-08-0003
NONDESTRUCTIVE INSPECTION RESEARCH OF COMPOSITE MATERIALS USED ON THE COMMERCIAL FLEET

1. Background

The Federal Aviation Administration (FAA) recognizes that the use of composite structures in both commercial and general aviation aircraft is increasing due to their light weight and associated fuel savings, their improved fatigue performance and lack of corrosion susceptibility, and the flexibility they provide to aircraft designers. But by the nature of their fabrication, composites pose new and unique challenges to aviation inspectors. As their usage continues to expand from secondary to primary structures, improved nondestructive inspection (NDI) methods will be required to better detect and characterize damage of these materials.

2. Purpose

The purpose of this BAA is to solicit and fund research proposals from the NDI community that offer practical and achievable solutions to a number of inspection related challenges posed by the increased use of composite materials in civil aviation. These challenges include but are not limited to:

- Detection of barely visible impact damage (approx 0.05 - 0.10-inch deep impression);
- Methods to accurately characterize the extent of composite damage due to an impact both prior to and after repair;
- Methods to measure key characteristics of critical composite damage that can be used to reliably assess structural integrity (residual strength and resistance to repeated load);
- Methods to enhance visual inspection schemes for detecting critical composite defects and damage;
- Methods that measure the structural integrity of adhesive bonds in order to detect weakened or “kissing” disbonds;
- Detection of aged or heat damaged composites including degradation of material properties due to extreme temperatures, moisture, or chemical exposure;
- Detection of fluid ingress;
- Detection of porosity and foreign materials in cured structure;
- Fast, low-cost, large area inspection methods to detect impact damage in laminated structures not clearly visible from the exterior surface. Proposed methods should be more efficient than current ultrasonic methods;
- Methods to detect disbonds at composite-to-metal interfaces;
- Methods to detect matrix micro-cracking beneath painted surfaces;
- Methods to inspect highly attenuative materials such as braided structure;
- Assessing the quality of manufactured composite parts

Submitted proposals should focus on solutions to one or more of the above challenges. Offerors may submit proposals on other composite inspection issues but these should include a detailed description of the specific problem being addressed.

At this time, it is not the intention of this BAA to solicit proposals calling for structural health monitoring (SHM) using distributed, remote, or embedded sensors. Depending on the availability of funds, a BAA covering SHM technologies may be issued at a future date.

3. Submission Deadlines

Technical summary proposals (see section 4) prepared in accordance with this synopsis will be accepted through 29 February 2008 or until fiscal year 2008 funding for this effort is committed, whichever occurs first. Upon request of the FAA, formal proposals shall be submitted within 45 calendar days after the date of the request. This request will be made via email and letter.

4. Submission Requirements

Offerors will submit two-page technical summaries prior to submitting a formal proposal. The two page technical summary shall meet the requirements described below in paragraph 5. Mail the two page technical summaries to:

FAA
William J. Hughes Technical Center
Code AJP-6360 (Attn: P. Swindell)
Atlantic City Int'l Airport, NJ 08405

In addition (not as a substitute for the paper copy), an electronic version of the summary proposal will be emailed to paul.swindell@faa.gov. The electronic version shall be provided in Microsoft Word or Adobe Acrobat format.

No later than 45 days after receipt of the two-page technical summaries, the FAA will respond to offerors in one of four ways:

a. Request for the submission of a formal proposal.
b. Recommendation to submit a formal proposal if certain changes are made or conditions met.
c. Notification that the white paper was good but due to insufficient funding, a formal proposal request is delayed until the next FY.
d. Rejection of the summary proposal and no request for a formal proposal.

If requested by the FAA, the offeror shall submit a formal proposal, containing a detailed discussion of the subject presented in the two-page technical summary. The formal proposal shall address the requirements described in the 'Formal Proposal Requirements' section of this announcement. The formal proposal will be mailed to the FAA at the same address as the summary proposal. An electronic copy must also be provided.

5. Two-Page Technical Summary Requirements

There is no specific format for the two page technical summary. The summary may be preceded by a cover letter, but the cover letter will not be considered in the evaluation, nor will pages in excess of two be considered. At a minimum the summary shall contain the following items:

a. The specific purpose of the proposed research;
b. A description of the proposed research;
c. Information regarding the interest or endorsement from the airline industry including but not limited to aircraft OEMS, airline carriers, and repair stations;
d. The current state of development of the proposed research;
e. The estimated time it would take to complete the proposed research;
f. A description of any proposed testing and evaluation procedures for the proposed research; and
g. The estimated funds required for the proposed effort.

6. Formal Proposal Requirements

Formal proposals will only be submitted at the request of the FAA and must be received no later than 45 calendar days after the request date. Formal proposals shall consist of separate technical and cost proposals and must comply with the requirements listed here..

a. Offerors shall describe in full detail, the technique involved, and whether equipment, transducers, sensors, etc need to be developed. Details should include:

   1. Aircraft type, component to be inspected, material to be inspected
   2. Damage and flaw type to be found
   3. Location and size of flaw to be found
   4. The current and projected ending TRL (technology readiness level) of the project, equipment and/or technique
   5. Any special or unique operating conditions required to support the application of the proposed technology
   6. Any relevant Probability of Detection (POD) data in existence or to be completed

b. Offerors must identify a partner within the aviation community (i.e., an airframer, aircraft operator, or repair station) who will serve as an advisor and advocate for the effort. Proof of commitment, such as a letter of intent, by the partner will be provided with the proposal. The proof need not be a contract. Matching funds or services-in-kind from the partner are not required but will be considered positively during proposal evaluation.

c. Offerors shall propose to the FAA a validation plan, which includes blind testing. If possible, validation will be performed at Airworthiness Assurance NDI Validation Center (AANC) in Albuquerque, NM using existing sample sets. Use of existing sample sets are free of charge. If the sample sets are not suitable to the validation of the proposed technology, address the rational for this conclusion and provide an alternative plan for validation. Alternatives will likely include obtaining applicable test specimens from a willing aviation industrial partner. The proposal will address all costs related to the validation effort.

d. Offerors shall prepare an implementation and technology transfer plan, describing how the proposed technology will be developed into commercial products or practices that are practical for use in the inspection and maintenance of existing aircraft in the commercial fleet.

e. The proposal shall identify all areas of risk related to development, implementation, and technology transfer, of the proposed system, technology, or technique. The proposal shall include mitigating strategies for each risk area. Proposals that do not identify risk areas will be considered non-developmental in nature and therefore outside the scope of this research program. Implementation risks are associated with logistical issues, missing/inadequate support infrastructure, etc.

f. Offerors shall include with their proposals a separate detailed cost proposal. In-house funding, cost matching, services-in-kind, will be identified in the cost proposal as necessary. All manpower related to blind testing and validation shall also be provided..

g. The technical proposal, not including the detailed cost proposal, shall not exceed 30 single-spaced pages.

7. METHOD OF EVALUATION

Proposals will be evaluated in the five technical areas listed in order of decreasing importance:

a. Technical merit.

b. Utility to the FAA/aircraft OEMs/airline industry.

c. Investigative team competency, NDI experience, and partnership/collaboration.

d. Effective plan for project completion.

e. Technical risk.

Cost and cost realism will be evaluated as acceptable or unacceptable only. Acceptable proposals will have costs commensurate with the work load proposed and will not be in excess of $400,000 in any one fiscal year. Any proposal that exceeds $400,000 in one year will be rejected.

8. Period of Performance:

Efforts lasting between one and three years will be considered. Multi-year efforts will be funded in yearly increments, providing measurable and adequate performance is shown prior to each new funding increment.